Open Source & Accessible

Prime III

One Machine, One Vote for Everyone

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Accessible Open Source

- Open Source (GPLv3)

  - Run on COTS

  - September 2015, https://github.com/HXRL/Prime-III

- Universal Design

  - All voters can vote on the same machine

- Multilingual

- Multi-Purpose

  - Absentee, Tally, In-Person, Mobile Device

User Interface

Voter - Multimodal

- Multimodal Interactions

  - Voters can speak and touch interchangeably

Voter - Visual

- Touch screen tablets

  - Large fonts

  - Images or No Images

  - Touchable Names

- Voter touches the screen to make selection

  - Confirmation is visual

- Ballot layout

  - One race per screen

Voter - Haptic

- Rocker Switch

  - Large texture on buttons

  - Select and Next

- Voter presses buttons for navigation and selection

Voter - Verbal

- Headset

  - The system speaks to the voter through the headset

  - Conversation is confidential – no one can hear the machine's speech, but the voter

- Embedded microphone in the headset

  - Voter speaks words like "vote", "continue", etc. or blows into the microphone

  - Confirmation is verbal

Voter - Accessibility

- Sighted

- Blind

- Deaf

- Illiteracy

  - Sighted and Blind

- Physical Disabilities

  - Limited or no use of hands

  - For example, military wounded in Iraq, elderly, etc.

- All of these voters can privately and independently vote!

Security

Security - VVGB

- Voter-Verified Green Ballot (VVGB)
  - Printed ballots will contain only the selections for each race
  - May be printed on paper with a watermark
  - Green approach to voting
    - All paper is used and recycled

NIST Standard Ballot

1. President and Vice-President ==> Joseph Barchi and Joseph Hallaren (B) 10648

2. US Senate ==> Victor Martinez (V) 577591

3. US Representative (write-in) ==> Juan E. Gilbert   888

4. Governor ==> Barbara Williams (A) 262144000000

5. Lieutenant-Governor ==> Paul Swan (W) 68719476736

6. County Commissioners ==> Eric Savoy (Y) 4717

6. County Commissioners ==> Helen Moore (O) 2402318

6. County Commissioners ==> Martin Schreiner (R) 511600

7. Proposition #1 ==> Yes 92900

8. Amendment #1 ==> Accept 3618

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1. President and Vice-President ==> Joseph Barchi and Joseph Hallaren (B) 10648

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7. Proposition #1 ==> Yes 92900

8. Amendment #1 ==> Accept 3618

NIST Standard Ballot

1. President and Vice-President ==> Marzena Pazgier and Welton Phelps (W) 2176782336

2. US Senate (write-in) ==> Robyn Gilbert 888

3. US Representative ==> Carroll Forrest (V) 70168848

4. Governor ==> Althea Sharp (W) 31640625 🧓

5. Lieutenant-Governor ==> Paul Swan (W) 68719476736

6. County Commissioners ==> Sheila Moskowitz (P) 64339296875
6. County Commissioners ==> Martin Schreiner (R) 511600
6. County Commissioners (write-in) ==> Kristy Boyer 888

7. Proposition #1 ==> Yes 900299

8. Amendment #1 ==> Accept 3618

- Ballots are scanned by a separate machine

  - Scanned using OCR or QR Code

    - This creates a text file version of each ballot

- Separate software reads the ballot files and generates a tally

Prime III

Open Source Election Pilots
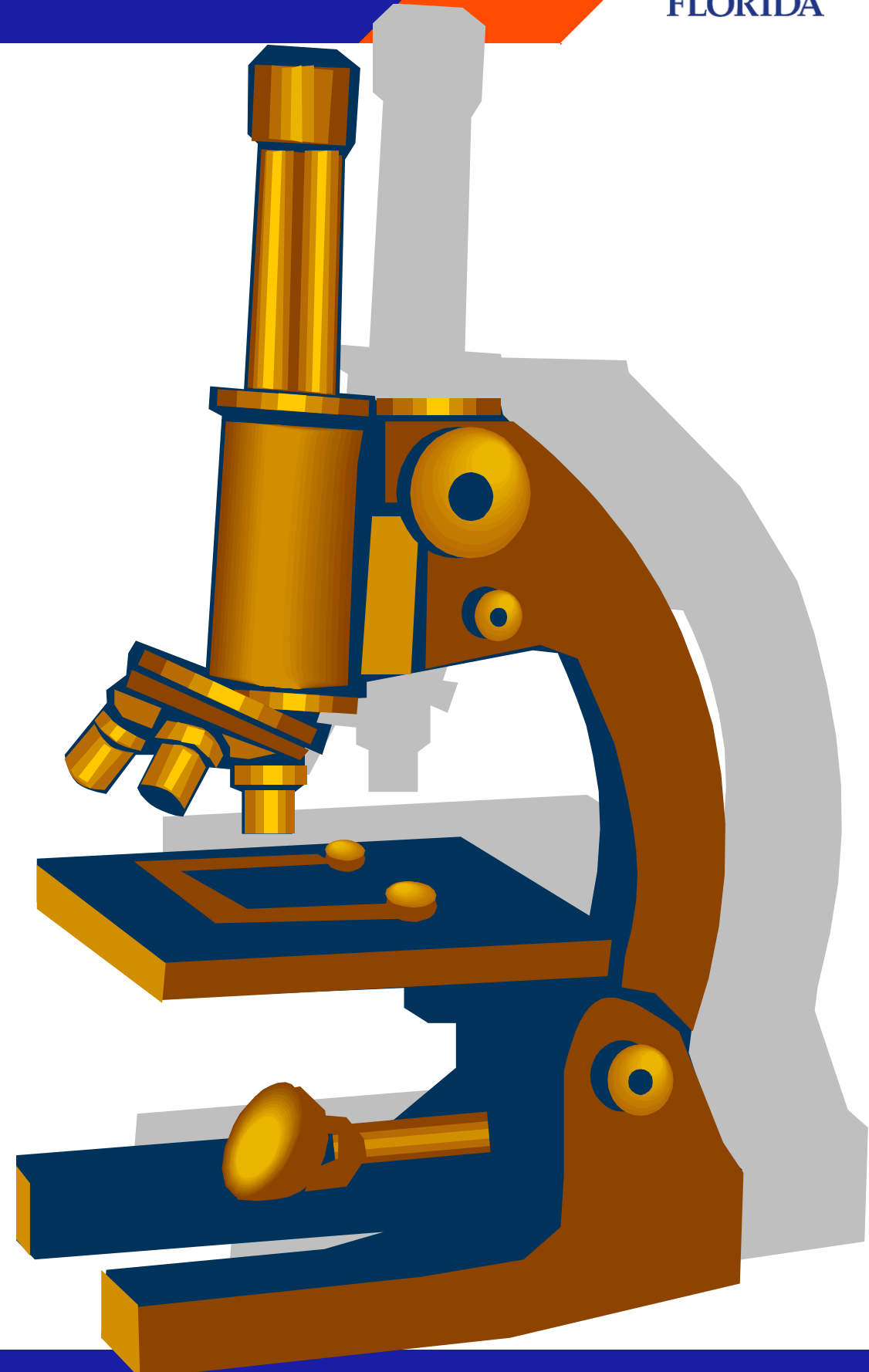
Elections

- Oregon
  - May 2012

- Rehabilitation Centers

- Voters print ballot

- Ballots are mailed in

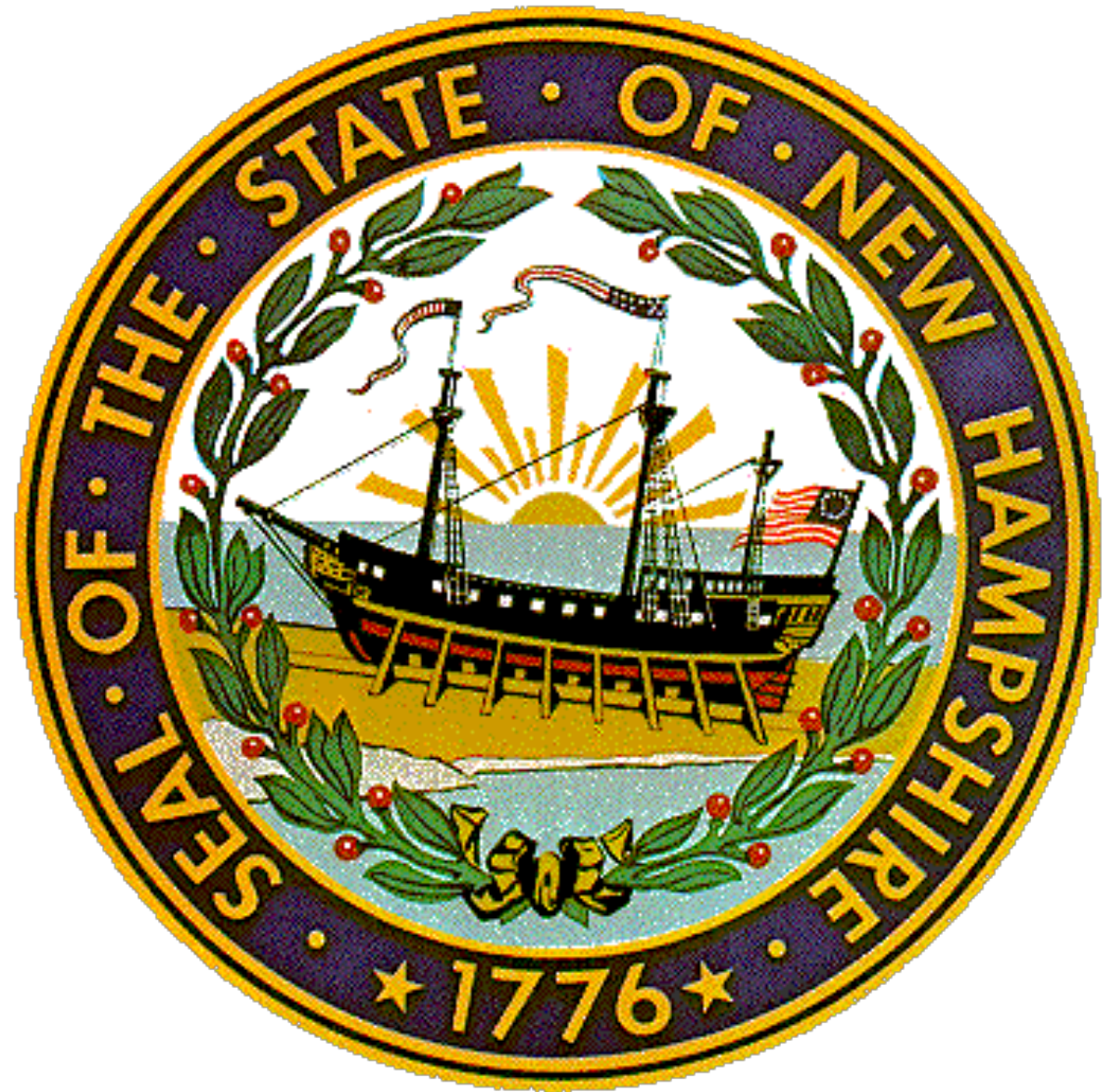- Optical scan ballots were hand-marked

Elections

- Wisconsin
  - April 1, 2014

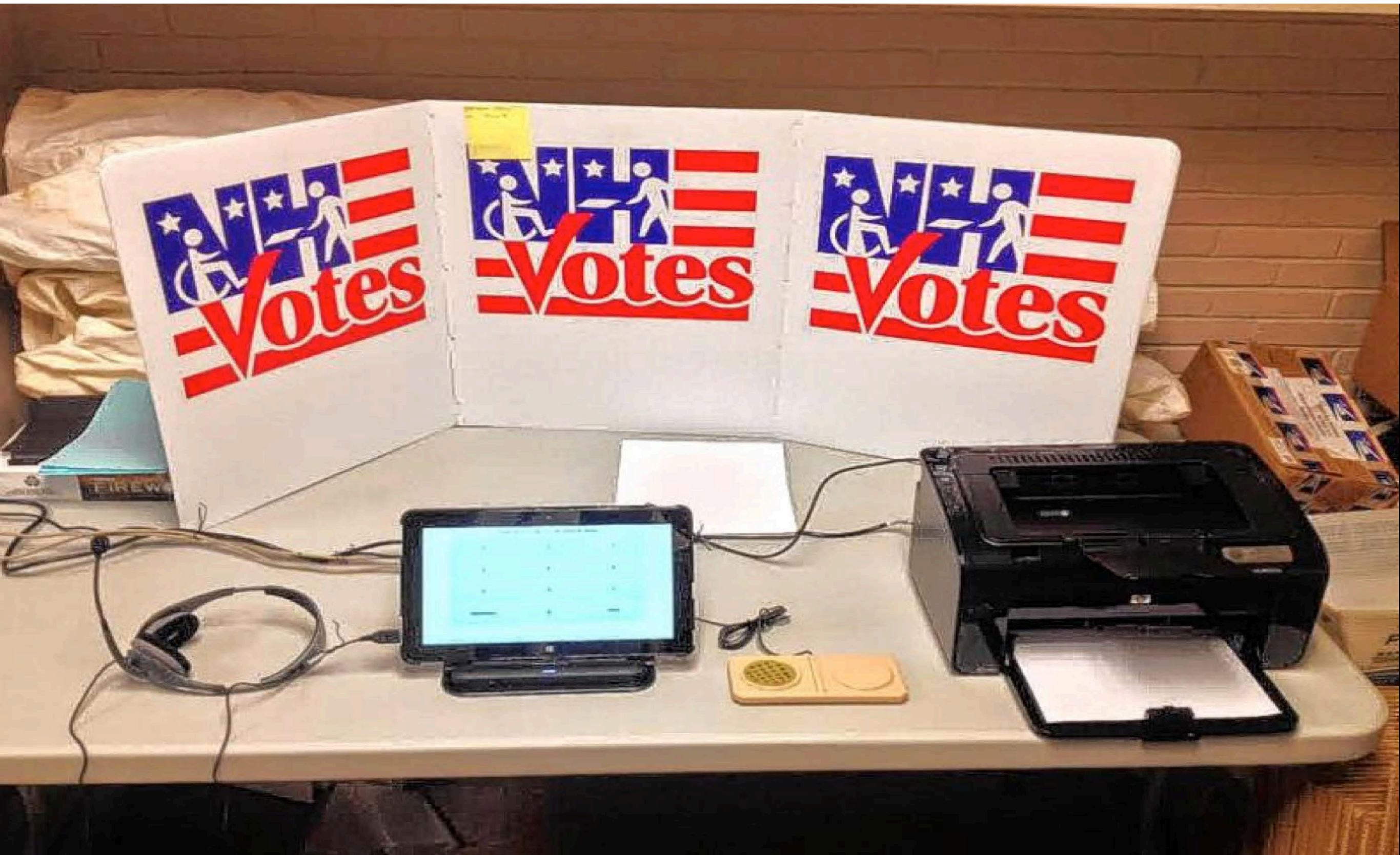- Rural Precincts

- Use iOCR
  - Identified software bug

Elections

- ## New Hampshire
  - September 9, 2014
  - Primary Election with Prime III

- ## New Hampshire
  - November 4, 2014
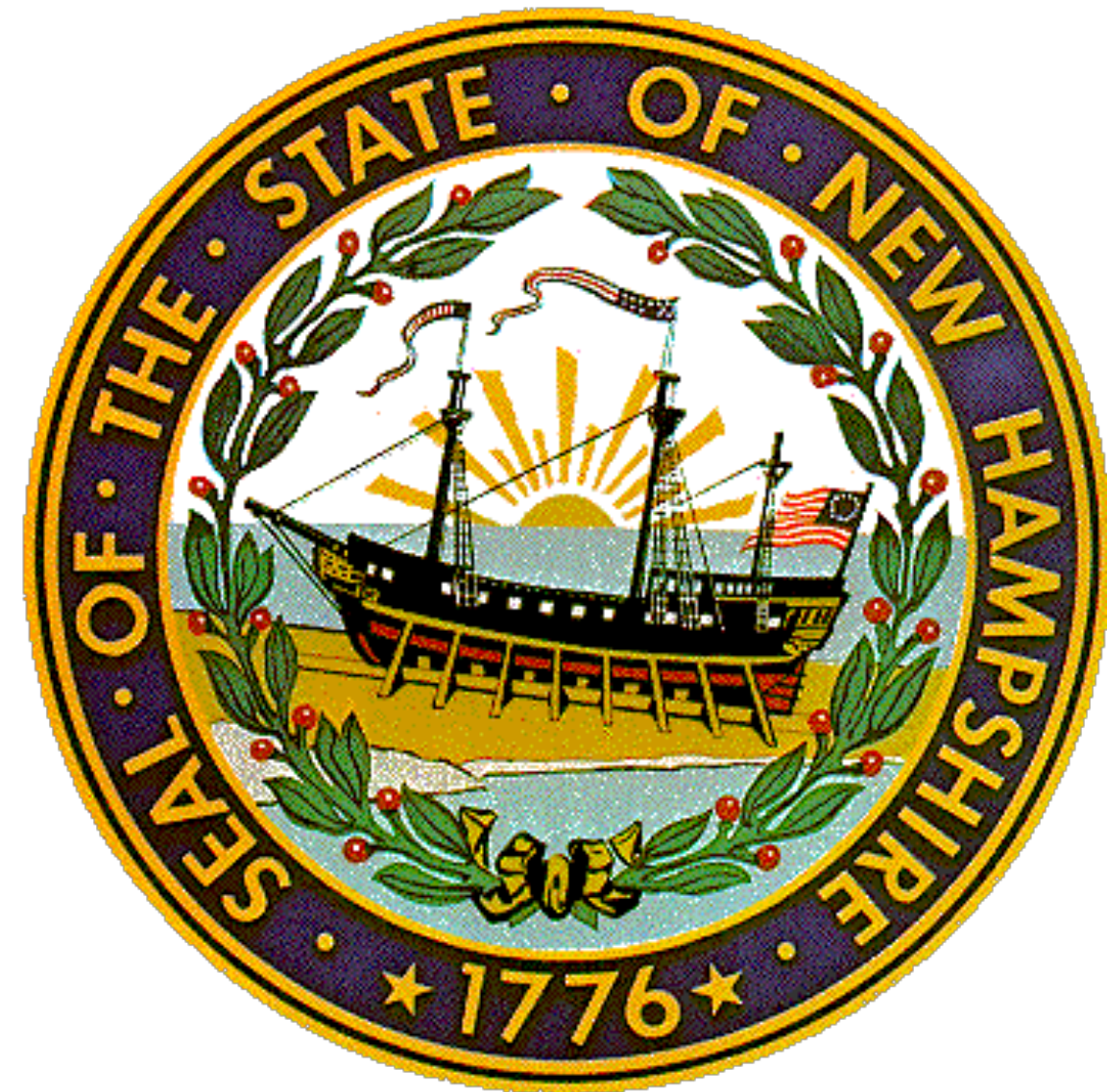 - Mid-Term Election with Prime III

New Hampshire 2016

- Statewide Use of one4all powered by Prime III

- Presidential Primary
  - February 9, 2016

New Hampshire 2016

- "We think the one4all, powered by Prime III, was a huge hit with our election officials and our disability community. Even where we experienced technical problems, the disability voters were generally understanding and hopeful for future elections using this system."

  – Thomas F. Manning, NH Assistant Secretary of State

New Hampshire 2016

"In 2014, we found a version of open source software that Dr. Juan Gilbert and his Prime III team had made available to the public. With the active support of Dr. Gilbert's Prime III team and the good work of the California Association of Voting Officials, we used it in several pilots in New Hampshire polling places in both the 2014 State Primary and General Election. People with disabilities and election officials responded very positively.

New Hampshire 2016

With that experience behind us, we decided to implement the system statewide in the 2016 Presidential Primary and henceforth. We conducted more user testing, obtained valuable input from the disabilities community and election officials, and designed architecture relying on our internal staff. We used the assistance of the Prime III team to make certain software changes.
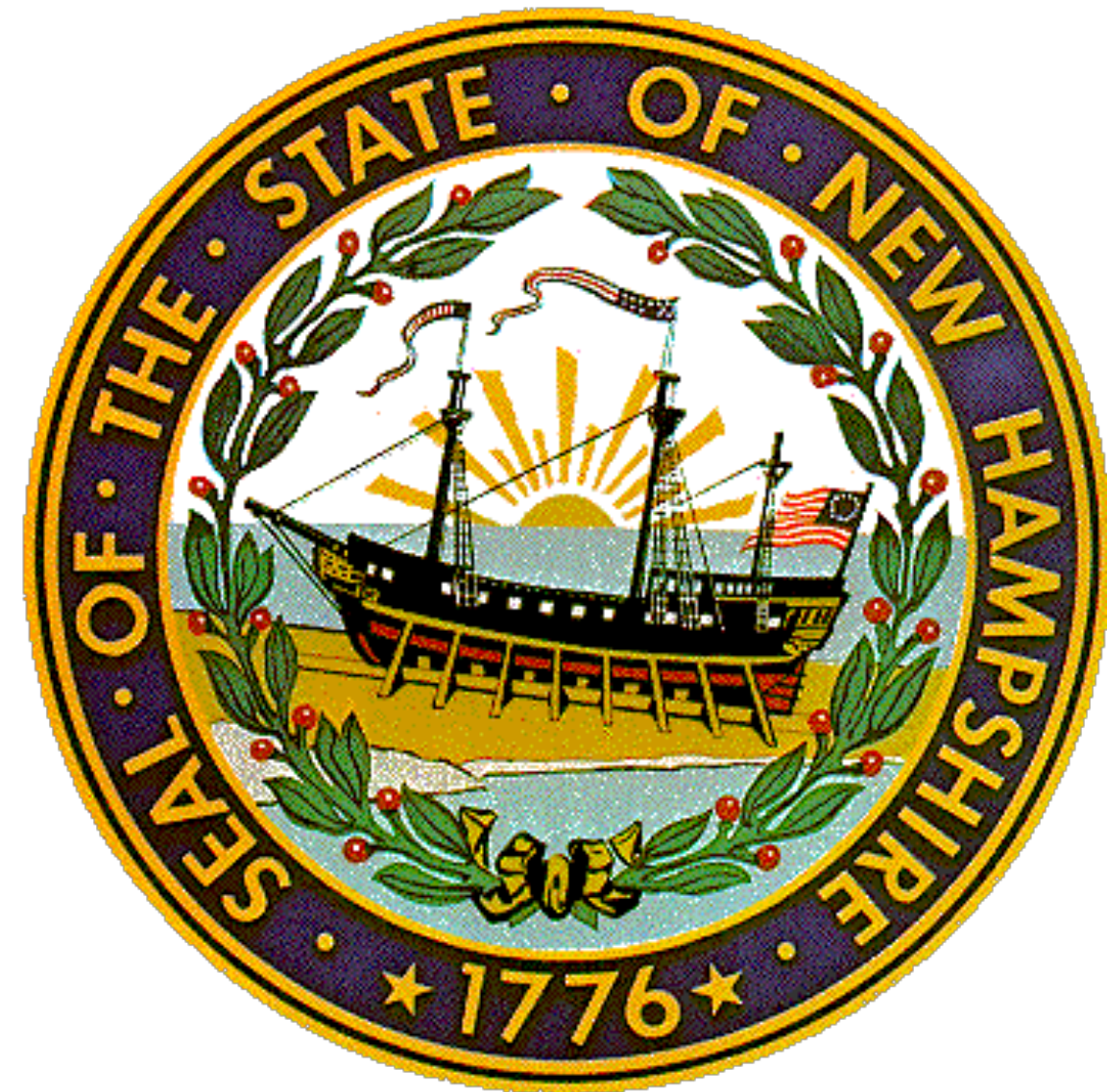
New Hampshire 2016

As time went on, we relied more heavily on our own staff and New Hampshire people with disabilities to revise and improve the user interface, ultimately naming the New Hampshire system one4all, reflecting our interest in making this available to a wide variety of individuals – one that is not limited solely to the disabilities community. We believe this goal is in the interest of all participants, because having more users ensures more voter privacy."

-William M. Gardner, NH Secretary of State

New Hampshire 2016

- Statewide Use of one4all powered by Prime III

- Presidential Election
  - November 8, 2016

National Science Foundation

- Prime III: Studying Usability & Security in Electronic Voting for Everyone (2007-2008)

- $93,056

United States
Election Assistance Commission

- Accessible Voting Technology Grant

- $4.5 million over 3 years

- Demonstration projects/elections

- Innovations in voting technologies with our partners …

RAAV
Research Alliance for Accessible Voting

Who Supported This Work?

So, what's next?

- More pilots
  - We get better with every pilot

- Certification
  - Once open source has been certified…

- New Election Management Models
  - Come to our breakout sessions tomorrow

Thank You

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